Lesson Plan: Air Zooka and Wind Tubes

1. Have students answer: If there is an explosion in outer space, can you hear it? (get several responses and even allow a debate if they are able to, but do not answer it). **5min**
2. Watch Brainpop.com - Hearing video. Username: dadesunset password: miamidade **5 min**
3. Show students Air Zooka. Pull back on the string all the way and release. Practice hitting paper attached to the wall to see them move. Aim at students and see the hair move. Many students have broken a few Air Zookas, so please be very careful if you let a student use it. **10 min**
4. Play hangman using the word: Vibrations **5 min**

Now ask: Would this Air Zooka work in outer space? (get responses and answer this question). *No. Sound is a waveform made by the compression and expansion of something called a 'medium’, such as a solid, liquid, or gas (like air). Sound is caused by vibrations passing through the air. The vibrations cause the air to expand and compress in waves from the source of the sound until it hits our eardrums and transmits the vibrations to the drum, into the ear and to the brain where we recognize it as something we call 'sound'.* **5 min**

1. Pair students in twos or threes and let them make music using the 5 tone music pipe. Ask them to try and make all 5 pitches. **10 min**
2. Have students answer: What was making the sound? (Answer: Air vibrating) **5 min**
3. Now ask: If there is no sound in outer space, why do movies show explosions with sound? –Accept all logical answers.
4. Read:

*In the vacuum of space, however, there is no air or any other medium, and therefore sound cannot travel. Light can travel through space because light is a waveform that is part of the electromagnetic spectrum (which includes radio waves, microwaves and x rays) and electromagnetic waves do not need a medium in which to travel.*

*The absence of sound in space is often forgotten in cheap science fiction movies where an alien spaceship is exploded and you hear the loud bang. In real life this would never happen. The best depiction of space and the absence of sound in it is in Arthur C Clarke's 2001: A Space Odyssey directed by Stanley Kubrick. Although it is one of the greatest science fiction movies of all time, it was criticized because of periods of silence during the 'space' scenes - but of course this was a factually accurate depiction as opposed to the cheap sci-fi 'B' movies where enemy ships explode in a flash of light and a huge bang.*